



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

April 11, 2014

MEMORANDUM

SUBJECT: National Remedy Review Board and Contaminated Sediments Technical Advisory Group
Recommendations for the Diamond Alkali Superfund Site, Lower Eight Miles of the
Lower Passaic River (Focused Feasibility Study Area)

FROM: Amy R. Legare, Chair
National Remedy Review Board

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Stephen J. Ells, Chair
Contaminated Sediments Technical Advisory Group

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TO: Walter E. Mugdan, Director
Emergency and Remedial Response Division
U.S. EPA Region 2

Purpose

The National Remedy Review Board (the Board) and the Contaminated Sediments Technical Advisory Group (CSTAG) have completed their review of the proposed cleanup action for the lower eight miles of the Lower Passaic River (LPR) at the Diamond Alkali Superfund site (the site), near Newark, New Jersey. This portion of the site is also referred to as the Focused Feasibility Study (FFS) Area. This memorandum documents the Board's and CSTAG's advisory recommendations.

Context for Board Review

The Administrator established the Board as one of the October 1995 Superfund Administrative Reforms to help control response costs and promote consistent and cost-effective remedy decisions. The Board furthers these goals by providing a cross-regional, management-level, "real time" review of high cost proposed response actions prior to their being issued for public comment. The Board reviews all proposed cleanup actions that exceed its cost-based review criteria.

The Board review is intended to help control remedy costs and to promote both consistent and cost-effective decisions. Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and National Oil and Hazardous Substances Pollution Contingency Plan (NCP), in addition to being protective, all remedies are to be cost-effective. The Board considers the nature of the site; risks posed by the site; regional, state, tribal and potentially responsible party (PRP)

opinions on proposed actions; the quality and reasonableness of the cost estimates; and any other relevant factors or program guidance in making our advisory recommendations. The overall goal of the review is to ensure sound decision making consistent with current law, regulations, and guidance.

Generally, the Board makes the advisory recommendations to the appropriate regional division director. Then, the region will include these recommendations in the administrative record for the site, typically before it issues the proposed cleanup plan for public comment. While the region is expected to give the Board's recommendations substantial weight, other important factors, such as subsequent public comment or technical analyses of response options, may influence the region's final remedy decision. The Board expects the regional division director to respond in writing to its recommendations within a reasonable period of time, noting in particular how the recommendations influenced the proposed cleanup decision, including any effect on the estimated cost of the action. Although the Board's recommendations are to be given substantial weight, the Board does not change the Agency's current delegations or alter the public's role in site decisions; the region has the final decision-making authority.

Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-08, February 2002, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites*, established the CSTAG as a technical advisory group to "...monitor the progress of and provide advice regarding a small number of large, complex, or controversial contaminated sediment Superfund sites...." One main purpose of the CSTAG is to guide regional site project managers on how to appropriately manage their sites throughout the cleanup process in accordance with the 11 risk management principles set forth in the OSWER Directive. EPA decided not to have a separate technical review by the CSTAG per OSWER Directive No. 9285.6-20, September 2009, *Changes to the Roles and Responsibilities of the Contaminated Sediments Technical Advisory Group (CSTAG)*, but instead elected to have a combined NRRB/CSTAG meeting for this site. This joint meeting format is the approach EPA plans to take in the future at CSTAG sites.

Overview of the Proposed Action

The Focused Feasibility Study (FFS) Area is the lower eight miles of the Lower Passaic River (LPR) in northeastern New Jersey, from the river's confluence with Newark Bay at River Mile (RM) 0 to RM8.3. The FFS Area is part of the Lower Passaic River Study Area (LPRSA), which is the 17-mile tidal portion of the Passaic River, from Dundee Dam (RM17.4) to the confluence with Newark Bay (RM0) and its tributaries. During a comprehensive study of the 17-mile LPRSA, the FFS Area sediments were found to be a major source of contamination to the rest of the LPR and Newark Bay. Therefore, the Region completed an FFS to evaluate taking action to address those sediments, while the comprehensive study of the 17-mile LPRSA is ongoing.

The Passaic River was one of the major centers of the American industrial revolution. Over 100 industrial facilities have been identified as potentially responsible for discharging a number of contaminants to the river, including, but not limited to, dioxins and furans, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dichlorodiphenyltrichloroethane (DDT) and other pesticides, mercury, lead and other metals. The FFS Area and 17-mile LPRSA are operable units of the Diamond Alkali Superfund Site, which includes the former Diamond Alkali facility located at 80 Lister Avenue in Newark and also encompasses an ongoing study of Newark Bay; a non-time critical removal of 200,000 cubic yards (cy) of highly contaminated sediments from the LPR adjacent to the former Diamond Alkali facility (Tierra Removal, Phase 1 and 2); and a time-critical removal action to address

the risks posed by elevated concentrations of dioxins and PCBs (and other contaminants) found at the surface of a mudflat on the east bank of the LPR at RM10.9 in Lyndhurst (RM10.9 Removal).

The preferred alternative consists of dredging enough fine-grained sediment so that an engineered cap can be placed over the FFS Area without causing additional flooding and to allow for a navigation channel between RM0 and RM2.2. The dredged materials would be dewatered and transported to incinerators or landfills for off-site disposal. Should a decontamination technology become commercially viable and sited in the New York/New Jersey Harbor Estuary, the dredged material disposal option could include both off-site disposal and treatment through a local provider of the decontamination technology.

National Remedy Review Board and Contaminated Sediments Technical Advisory Group Advisory Recommendations

The Board and CSTAG (hereafter referred to as the Boards) reviewed the information package describing this proposal and discussed related issues with numerous Region 2 managers and staff on December 12 and 13, 2012. Several partner agencies also participated in the review: 1) US Fish and Wildlife Service, 2) US Army Corps of Engineers, 3) National Oceanic and Atmospheric Administration and 4) New Jersey Department of Environmental Protection (NJDEP). Based on this review and discussion, the Boards offer the following comments:

Site Characterization

Based on the information provided by the Region, the Boards note that the pesticide DDT and its degradation products (DDx) are contaminants of concern (COCs) in the river sediments. The documents provided to the Boards did not provide clear information on the transport pathways of DDx. The transport pathways may have included historic direct wastewater discharge to the Passaic River, and may now include contaminated surface water runoff and groundwater upwelling to the river sediments. Information obtained by EPA at other DDT manufacturing sites indicates that chlorobenzene is typically used as a solvent and carrier for DDT at a 1:1 mass ratio during the manufacturing process. The Boards recommend that the Region confirm whether chlorobenzene is or may be a DDx co-contaminant in the soil and groundwater. In addition, the Boards recommend that additional soil and groundwater characterization be conducted to evaluate the DDx contributions and, if present, chlorobenzene as the sources to the overall DDx and chlorobenzene loads in the river sediments. If the Region identifies chlorobenzene at actionable levels, the Boards further recommend that the Region address it in its decision documents as part of the remedy selection process (either in the current Record of Decision [ROD] or in a future decision document). The Boards recommend that the Region consider as a potential alternative an enhanced (active layer component) sand cap for river stretches where mobile COCs such as chlorobenzene are associated with high groundwater discharge rates or non-aqueous phase liquid (NAPL) seepage into the river sediment.

Waste Characterization

The information provided to the Boards in the package indicates that a conservative approach was used to define which FFS Area sediments were assumed to be Resource Conservation and Recovery Act (RCRA) characteristic waste for estimating off-site disposal costs. This conservative approach resulted in the Region determining that 7–10 percent of the contaminated sediments would be treated. The

Boards recommend that the decision documents contain a thorough and clear explanation regarding how the Region's RCRA determination is consistent with 40 CFR Part 261 and associated guidance, and any applicable or relevant and appropriate state regulations.

Institutional Controls

According to the review package, some institutional controls (ICs) are already in place at this site (e.g., NJDEP fish and crab consumption advisories). The Boards recommend the Region consider whether additional ICs should be added to alternatives that have been identified, to help ensure protectiveness of human health and the environment or to help protect the selected remedy's integrity (e.g., controls to prevent disturbance of the sediment cap and dredging or remedy-associated sediment disturbance in the river reach). The Boards also recommend that, consistent with OSWER Directive No. 9355.0-89, November 2010, *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites*, Interim Final), the Region should consider identifying in the decision documents the types of instruments that may be employed, the use restriction objectives of the ICs, the media to which the ICs would pertain, and the areas over which the ICs are needed to help ensure protectiveness of human health and the environment.

In addition, the Boards note that the review package states that the "no-action" alternative includes continuation of existing ICs. As discussed in OSWER Directive No. 9200.1-23P, July 1999, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, a "no action" alternative should not include existing ICs. The Boards recommend that, consistent with the ROD guidance, the Region remove the reference to ICs in the "no-action" alternative.

Ecological Risk

Based on the Region's presentation, the Boards note that 1) the FFS ecological risk assessment (FFS ERA) is largely a conservative, literature-based FFS ERA; and 2) contaminants at this site are co-distributed. The Region indicated in its package that additional ERA efforts are being conducted as part of the larger 17-mile LPRSA and Newark Bay study areas and that a full baseline ERA (BERA) will be completed for those operable units of the site. The Boards note that the FFS ERA does identify the site COCs and a risk-based justification for remediation; however, literature-based numerical, chemical-specific ecological preliminary remediation goals (PRGs) do not appear to be necessary for all identified contaminants in this proposed remedial action. Furthermore, the Boards note that contaminant-specific PRGs based upon the ongoing BERA efforts for the 17-mile and Newark Bay study areas may be different than those that could be derived from the FFS ERA. The Boards recommend that, for remedy selection purposes, the decision documents contain a 1) clear identification of the site-specific COCs posing an unacceptable risk to site-specific human health and the environment; 2) discussion of why the use of CERCLA response authority is warranted; and, 3) COC-specific explanation of the PRGs and cleanup levels (e.g., the Region's basis for each of the contaminant concentrations proposed as PRGs). This should help ensure site-wide consistency in the remedial action objectives (RAOs).

The Boards note that the tissue-based avian embryo effects levels for tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalency quotient (TEQ) may not be protective based on recent studies (Head JA, ME Hahn and SW Kennedy, 2008, *Key amino acids in the aryl hydrocarbon receptor predict dioxin sensitivity in avian species*) describing categories of species sensitivity relative to dioxin-like

compounds. While this possible non-protectiveness likely would not change the proposed remedy for this operable unit since the ecological PRGs for the lower 8.3 miles are based on the overall lowest ecological value (site-specific sediment PRGs for oysters), the Boards recommend that the Region discuss this issue in the BERA to more accurately identify any potential uncertainties in the characterization of avian risks.

The Boards further note that, throughout the FFS ERA, the Region has presented separate TEQ exposure concentrations for both PCBs as a group and dioxins as a group, an approach that appears to be different from current Agency guidance on considering the toxic equivalency factor (TEF) approach for wildlife (EPA 100/R-08/004, June 2008, *Framework for Application of the Toxicity Equivalence Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment*). The Boards recommend that the Region revise these portions of the FFS ERA to address ecological exposures to all dioxin-like compounds in a holistic manner, or explain in its decision documents the basis for its approach in light of existing CERCLA guidance.

Principal Threat Waste

Based on the information provided by the Region, the Boards note that the remedy for the FFS Study Area seems to be driven by dioxin and PCBs, both of which are CERCLA hazardous substances. Given their concentrations, it appears that both might represent Principal Threat Waste (PTW) due to their toxicity. The Boards note that OSWER Directive No. 9380.3-06FS, November 1991, *A Guide to Principal Threat and Low Level Threat Wastes*, provides guidance on identifying PTW, as well as on the statute's preference and the NCP's expectations for treatment of PTW. The Boards recommend that the Region fully explain in its decision documents how its approach to the dioxin and PCB contamination at this site is consistent with CERCLA and the NCP, including specifically CERCLA § 121(b)(1)'s preference for treatment "to the maximum extent practicable;" CERCLA § 121(d)(1)'s requirements regarding selection of remedies that ensure protectiveness of human health and the environment and achieve (or where appropriate, waive) applicable or relevant and appropriate requirements; 40 CFR § 300.430(a)(1)(iii)(A)'s expectation that "treatment [be used] to address the principal threats posed by a site, wherever practicable;" and 40 CFR § 300.430(f)(1)(ii)(E)'s preference for treatment "to the maximum extent practicable" while protecting human health and the environment, attaining ARARs identified in the ROD, and providing "the best balance of trade-offs" among the NCP's five balancing criteria.

Remedial Action Objectives/Preliminary Remediation Goals

Based on the information presented to the Boards, the Region has established background concentrations of the risk-driving COCs. However, the package presented to the Boards does not clearly explain how background concentrations are to be used; it also is unclear regarding the Region's site-specific RAOs (e.g., it indicates both risk-based PRGs and background-based "interim" PRGs were developed). Additionally, the risk-based PRGs presented in the package appear to be based on either human health or ecological risk-based concentrations, and some of these values may be below background concentrations.

As discussed in OSWER Directive No. 9285.6-07P, May 2002, *Role of Background in the CERCLA Cleanup Program*, "Background information is important to risk managers because the CERCLA program, generally, does not clean up to concentrations below natural or anthropogenic background

levels." The Boards note that site-specific modeling suggests the preferred alternative may yield post-remedy concentrations that are below background levels post multi-year remedy implementation. The Boards recommend that the Region clearly explain in its decision documents how, considering EPA guidance, information regarding background was taken into account when developing RAOs, PRGs, and final cleanup levels.

Based upon the RAOs described in the Region's package, it appears that the overall result of implementing the Region's preferred alternative should be a significant reduction in sediment and biota contamination within the Passaic River system. However, the Boards' understanding is that the predicted reductions do not account for the feeding ranges of the potentially affected fish and crab and, therefore, may overestimate the risk reduction compared to current site conditions. As such, the Region's preferred alternative may not achieve fish or crab tissue contaminant concentrations protective of human health without the continuation of fish consumption advisories. The Boards recommend that the decision documents clearly explain how the Region's preferred approach to remedial action for this OU will achieve the RAOs developed by the Region.

Remedy Performance

Based on the review package and presentation, the Boards understand that the dioxin sediment cleanup level is 5 parts per trillion (ppt), based on the protection of ecological receptors. In addition, it appears that the Region is assuming that after sediment dredging and capping in the river's lower eight miles, the surface sediment layer would achieve this concentration. The Boards note that recontamination could prevent the attainment and maintenance of 5 ppt of dioxin in sediment over time; potential sources of recontamination include, but are not limited to, resuspension caused by the cleanup itself and transport from the yet-to-be remediated parts of the LPR and Newark Bay. Although the modeled predictions of post-remediation surface sediment concentrations account for some degree of recontamination, the Boards note that there are uncertainties associated with the Region's model assumptions related to recontamination and how they are being used to predict the river system's behavior during and after remediation. The Boards recommend that a charge to the peer reviewers of the model include evaluating how the model deals with recontamination.

The Boards note that it would be counterproductive to use capping material that has contaminant levels higher than the cleanup levels. The Boards recommend that the Region explain in its decision documents how it plans to make sure that concentrations of dioxin and other COCs in the capping material are below the cleanup levels.

As discussed in the package, the Region attempted to identify a viable decontamination technology for dredged material management (DMM), but none of the decontamination technologies evaluated during the FFS proved implementable on a commercial or full-field scale at this time. In the information presented to the Boards, the Region indicated that it plans to write its decision documents in a way that would allow for the local decontamination and re-use (DMM Scenario C) for all or a portion of the sediment, should reliable technologies become available. The Boards commend the Region for continuing to give serious consideration to decontamination and re-use alternatives. The Boards recommend that the Region consider indicating in its decision documents that EPA may, in the future, modify the remedy to provide for sediment treatment if a viable decontamination technology becomes available.

Based on information presented to the Boards, after the sediments of the FFS Study Area were found to be a major source of contamination to the rest of the LPR and Newark Bay, the Region initiated the FFS to evaluate taking action to address those sediments in the lower 8 miles of the LPR while a comprehensive RI/FS of the 17-mile LPRSA is ongoing. The Boards recommend that the decision documents clearly explain its rationale for concluding that the proposed FFS remedy would be consistent with the remedy to be selected in the future for the entire river.

Cost

Based on the information provided, the Boards note that the Region presented three DMM scenarios for alternatives 2 and 3. The Region's preferred alternative (alternative 3) includes DMM scenario B (off-site disposal), which is approximately \$840 million higher (total net present value) than alternative 3 with DMM scenario A [confined aquatic disposal (CAD)]. The Boards also note that CADs have been used at other Superfund sites and by the Army Corps of Engineers as part of other dredging projects. The Boards further note that a CAD would be somewhat similar, on a conceptual basis, to the capping of the remaining contaminated sediments within the LPR, which would occur post-dredging under the Region's preferred approach. Therefore, the Boards recommend that the Region reconsider the less costly CAD scenario and clearly explain in its decision documents the basis for the Region's preferred off-site disposal scenario.

In addition, the Boards note that the Region's considered disposal scenarios did not include an upland confined disposal facility (CDF). At other Superfund sites, EPA has selected CDFs for contaminated sediment, and based on information presented to the Boards, the Region may be considering a CDF for the disposal of 160,000 cy of sediment from the Phase 2 Tierra removal. The Boards recommend that the Region explain in its decision documents the rationale for not considering and including an alternative involving an upland CDF for the LPR cleanup.

Modeling

The Boards recommend that the Region's schedule allow sufficient time to address external peer reviewers' and the CSTAG's comments on the Region's sediment transport, organic carbon, and contaminant transport and fate models before the proposed plan is released. Doing so should give the Region an opportunity to address any potential deficiencies identified by the peer reviewers and the CSTAG, and to make any appropriate modeling modifications, including re-running the models, if necessary. Finally, the CSTAG chair requests receipt of a copy of the modeling report when the Region sends it to the external peer reviewers.

Since it may not be practical to perform a formal uncertainty analysis for fate and transport models, the Boards recommend that the Region perform an extended sensitivity analysis for all three models used to simulate the FFS' remedial alternatives. The results from this analysis should provide a useful estimate of the degree of uncertainty associated with the 60-year remedial alternative simulations. The Boards further recommend that the resulting uncertainty bands be taken into account during the remedy selection process.

Documentation

The information presented to the Boards reflected many of the site's complex design issues associated with dredging, dewatering, resuspension, and capping. Consistent with the NCP and existing CERCLA guidance documents (e.g., the 1999 ROD guidance), the Boards recommend that the Region's decision documents ensure meaningful public participation by describing in sufficient detail the relevant aspects of potential alternatives (e.g., dredging technology and its associated impacts, capping size and thickness, sand thickness, etc.), recognizing that some details may be appropriately left for the remedial design phase. The Boards believe such an approach should help the Region achieve RAOs and cleanup levels in a manner that is timely in both remedy planning and implementation while also ensuring CERCLA and the NCP consistency (e.g., ensures human health and environmental protectiveness by meeting ARARs, realizing cost-effectiveness, etc.).

In the package provided to the Boards, the Region screened out alternative 4 because the model predicted it would not achieve protective levels. The Boards recommend that the Region, in its decision documents, further explain the rationale for screening out this alternative, including an explanation as to whether ICs could have been used to help ensure protectiveness of human health.

Conclusion

We commend the Region's collaborative efforts in working with the Board, CSTAG and stakeholder groups at this site. We request that a draft response to these recommendations be included with the draft proposed plan when it is forwarded to the Office of Superfund Remediation and Technology Innovation's Site Assessment and Remedy Decisions (SARD) branch for review. The SARD branch will work with both your staff and the Board to resolve any remaining issues prior to your release of the record of decision. This memo will be posted to the Board's website (<http://www.epa.gov/superfund/programs/nrrb>) and CSTAG's website (<http://www.epa.gov/superfund/health/conmedia/sediment/cstag.htm>) within 30 calendar days of our signatures. Once your response is final and made part of the site's administrative record your response will also be posted on the Boards website.

Thank you for your support and the support of your managers and staff in preparing for this review. Please call Amy Legare at (703) 347-0124 or Steve Ells at (703) 603-8822 should you have any questions.

cc: J. Woolford (OSRTI)
D. Stalcup (OSRTI)
R. DeLeon (OSRE)
R. Cheatham (FFRRO)
D. Ammon (OSRTI)
D. Cooper (OSRTI)
NRRB members
CSTAG members